# Blöte and Nienhuis reply

Blöte, H.W.; Nienhuis, B.

*Published in:*
Physical Review Letters

*DOI:*
10.1103/PhysRevLett.73.2787

**Blöte and Nienhuis Reply:** The results reported by Kondev and Henley in the preceding Comment [1] constitute very interesting additional information on the fully packed loop (FPL) model [2–6]. Not only did they for the case $n = 2$ confirm analytically our numerical values [6] of the central charge and exponents, they also obtained additional exponents. The explicit equivalence of the FPL model to a solid-on-solid (SOS) model with two-dimensional height variables, is very clarifying.

Kondev and Henley [1] raise the question why the critical dimension $X = \frac{2}{3}$ governing the asymptotic behavior of the color-color correlation function [5] does not show up in our results [6]. This dimension is smaller than the temperature dimension $X_t$, and the corresponding transfer-matrix eigenvalue should therefore dominate. The explanation lies in the fact that, in the spectrum of the loop model transfer matrix, the eigenstate corresponding with $X = \frac{2}{3}$ is *not translationally invariant.* In contrast, the transfer-matrix results presented in our Letter apply to translationally invariant eigenstates [6].

Using the language of the loop representation, empty bonds correspond with one of the three colors. Thus one can explicitly compute color-color correlations using the transfer matrix for the $n = 2$ FPL model wrapped on a cylinder. We performed such calculations using finite sizes $L = 3$, 6, and 9. The results for the correlation length agree very well with the presence of a color dimension $X = \frac{2}{3}$.

H. W. J. Blöte[1] and B. Nienhuis[2]
[1]Laboratorium voor Technische Natuurkunde
Technische Universiteit Delft
P.O. Box 5046
2600 GA Delft, The Netherlands
[2]Instituut voor Theoretische Fysica
Universiteit van Amsterdam
Valckenierstraat 65
1018 XE Amsterdam, The Netherlands

Received 2 June 1994
PACS numbers: 75.10.Hk, 64.60.Ak, 64.60.Fr, 64.60.Kw

[1] J. Kondev and C. L. Henley, preceding Comment, Phys. Rev. Lett. **73**, 2786 (1994).
[2] R. J. Baxter, J. Math. Phys. **11**, 789 (1970).
[3] J. Suzuki and T. Izuyama, J. Phys. Soc. Jpn. **57**, 818 (1988).
[4] N. Yu. Reshetikhin, J. Phys. A **24**, 2387 (1991).
[5] D. A. Huse and A. D. Rutenberg, Phys. Rev. B **45**, 7536 (1992).
[6] H. W. J. Blöte and B. Nienhuis, Phys. Rev. Lett. **72**, 1372 (1994).

  